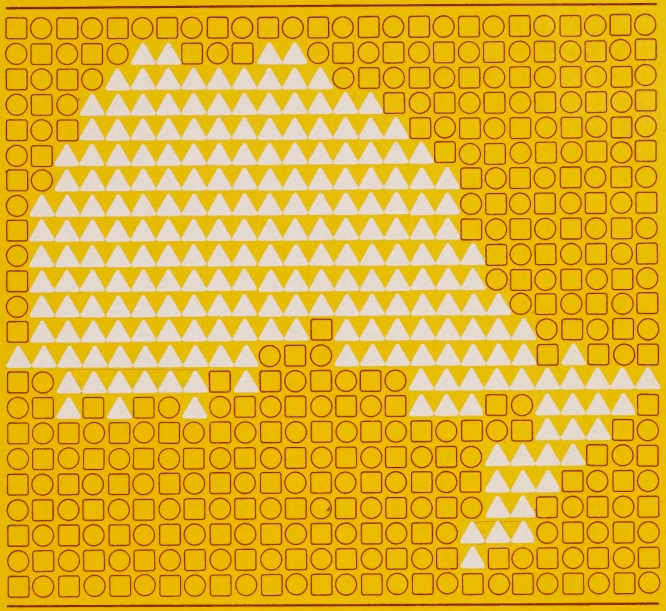
Ontario
Ministry of
Labour

Occupational
Health and Safety
Division

Roll-Over Protective Structures: A Guide to the ROPS Regulation



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Roll–Over Protective Structures: A Guide to the ROPS Regulation

August 1988

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Logo on cover provided courtesy of the Construction Safety Association of Ontario

Introduction

This guide has been prepared to help employers, workers, members of joint health and safety committees, supervisors and occupational health and safety personnel meet the requirements of the regulation regarding roll-over protective structures (ROPS). It also helps them to understand the responsibilities this regulation places on all participants in the workplace health and safety system.

The statements contained in this guide do not have legal binding effect but are intended to provide general answers to possible questions asked in the context of a specific situation. The regulation itself should be consulted to interpret and apply the law.

The Occupational Health and Safety Division of the Ministry of Labour is responsible for administering the *Occupational Health and Safety Act* and its regulations. The Regulation for Roll-Over Protective Structures, Ontario Regulation 524/88, was filed with the Registrar of Regulations on August 18, 1988 and came into force on that day.

For further information on any aspect of the ROPS regulation, you should contact the Inspectorate of the Ministry of Labour at the appropriate district office. The addresses and telephone numbers of the district offices of the ministry are listed in Appendix 1.

1. Definition

What Is a ROPS?

The word ROPS stands for 'roll-over protective structure'. A ROPS is a structure mounted on a vehicle and designed to protect an operator wearing a restraining device, for example, a seat belt, from being crushed when the vehicle rolls over.

About twenty operators are killed every year in Ontario when their off-highway vehicles roll over. These vehicles were not fitted with a ROPS and seat belt.

Operator training and safe operating procedures are major factors in preventing vehicle roll–over; however, in some cases, even the best trained and most experienced operator will not be able to prevent a roll–over. The use of a ROPS and seat belt will result in less serious injuries and, in most cases, will save the operator's life.

Vehicle Fitted with a ROPS

2. Application

Where Does the Regulation Apply?

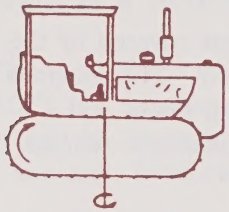
The ROPS Regulation applies to all workplaces covered by the *Occupational Health and Safety Act,* (the Act). This includes construction projects, industrial establishments, mines and mining plants and other work sites, such as hospitals, schools and apartment buildings.

The ROPS Regulation does not apply to farming operations as they are not covered by the Act. However, agricultural equipment used in operations other than farming (e.g. landscaping) *is* covered.

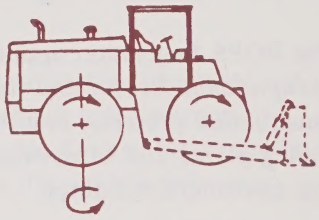
Note: The ROPS Regulation replaces subclause 115(a)(ii) of the Regulations for Industrial Establishments and section 112a of the Regulations for Mines and Mining Plants.

What Machines Are Covered Under the Regulation?

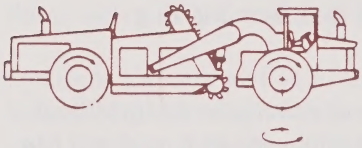
The ROPS Regulation applies to the following types of machines: tractors, bulldozers, scrapers, front-end loaders, skidders, graders, dumpers and compactors (but not asphalt compactors). It does *not* apply to equipment such as forklift trucks, mobile cranes, excavators, snowmobiles or off-road recreational vehicles. Examples of the machines covered are pictured below.



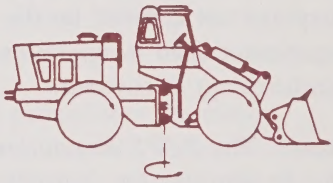
Tractor



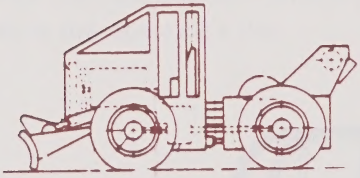
Bulldozer



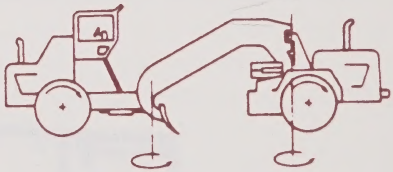
Scraper



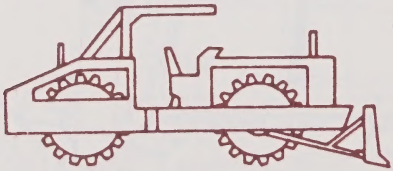
Front-end Loader



Skidder



Grader



Compactor

3. Exemptions

What Machines Are Exempted?

Small machines such as garden tractors are not covered by the ROPS Regulation because they may not be strong enough to support a ROPS. A 'small machine' is defined as any vehicle with *both* a low power rating (15 kilowatts (20 horsepower) or less, as rated by its manufacturer) *and* a mass under 700 kilograms (1,500 pounds).

Dump trucks with fully mounted bodies and enclosed cabs may not require additional ROPS protection because their structure may already provide equivalent protection.

Machines used primarily underground in a mine are exempted.

Machines that were manufactured before 1980 *and* not equipped with ROPS adaptors are exempted as well.

Skidder operators are exempt from the use of a seat belt, but the skidder must have a ROPS.

4. Requirements

What Are the Requirements for Machines?

All machines covered by the ROPS Regulation must be fitted with both a ROPS and a seat belt to protect the operator.

The employer must make sure that the required ROPS, the label showing that the ROPS is suitable and the seat belt are in place. The operator must operate the machine only when it is so equipped and use the seat belt when operating the machine.

Existing machines must be retrofitted within 12 months of the regulation becoming law.

What Are the Requirements for Maintenance, Modifications and Repairs to ROPS and Seat Belts?

The ROPS and the seat belt must be maintained in good condition. Modifications and repairs must meet or exceed the standards required for the ROPS or the seat belt, as applicable. Approval by the manufacturer or an engineer is required after the work is done.

5. Standards

What Are the Performance Standards for ROPS?

A ROPS must meet the performance standards listed below:

1. The ROPS must be securely fastened to the frame of the machine.

2. The ROPS must be able to resist the impact forces generated if the machine, travelling at 16 kilometres per hour (10 miles per hour) over a hard clay surface, rolls over once on its side along a 30–degree slope.

3. The ROPS must also support the machine in an upside-down position after it has rolled over as described in 2.

4. During the roll–over described in 2, and while the machine is upside down as described in 3, the ROPS frame must not enter the operator's space.

5. The ROPS must be able to resist all forces to which it is likely to be subjected.

How to Make Sure that Standards Are Met?

A ROPS that meets one of the specification standards listed below meets all performance standards:

1. The Canadian Standards Association Standard CSA B352–M1980 'Roll-over Protective Structures'

2. Society of Automotive Engineers Standard SAE J1040b, SAE J1040c or SAE J1040 FEB86 'Performance Criteria for Roll-over Protective Structures'

3. The International Organization for Standardization Standard ISO 3471–1975 or ISO 3471–1980 'Earth-Moving Machinery — Roll-over Protective Structures — Laboratory tests and performance requirements'

A custom-built roll-over protective structure must be certified by an engineer as meeting performance standards 2, 3 and 4.

A ROPS must bear a readable label showing:

1. The name and address of the manufacturer (or, if custom-built, the design engineer).

2. The make and model of the machine for which the ROPS is designed.

3. The maximum weight of the machine for which the ROPS is designed and built.

Certification by an engineer

THIS STRUCTURE, P/N _____, MEETS THE FOLLOWING REQUIREMENTS FOR THE MACHINES AND WEIGHTS LISTED:

ROPS			MAX. WEIGHT		MODEL
SAE	ISO	CSA	LBS.	KG.	

MANUFACTURED BY AAA. CORPORATION
ADDRESS: _____

Example: Label

What Are the Standards for Seat Belts?

It is critical that seat belts be used together with ROPS: A ROPS is of little use if the operator is not secured into the seat; and the forces acting on the operator during a roll–over are too great for him or her to hold on in the seat.

The operator must wear a seat belt when operating a machine.

The seat belt must meet the following performance standards:

1. The seat belt must secure the operator within the space protected by the ROPS.

2. The seat belt must be designed and arranged to reduce injury to the operator as much as possible.

A seat belt that meets either edition of the specification standard stated below meets the performance standards:

> The Society of Automotive Engineers Standard SAE J386 APR80 'Seat Belts for Construction Machines' or SAE J386 JUN85 'Operator Restraint Systems for Off-Road Work Machines'.

6. Appendices

Appendix 1 –Ministry of Labour District Offices

Barrie
Industrial Health and Safety
114 Worsley Street
L4M 1M1
(705) 722–6642
1–800–461–4383*

Elliot Lake
Mining Health and Safety
Algo Centre
151 Ontario Avenue
P5A 2T2
(705) 848–2885

Hamilton
119 King Street West
L8N 3Z9
Construction Health and Safety
Industrial Health and Safety
(416) 521–7736
1–800–263–6906(8)*

Kingston
1055 Princess Street
Suite 105
K7L 1H3
Construction Health and Safety
Industrial Health and Safety
(613) 545–4340
1–800–267–0915*
Mining Health and Safety
(Suite 301)
(613) 545–4335
1–800–267–0915*

Kirkland Lake
Mining Health and Safety
38 Second Street
P2N 1R1
(705) 567–5241

Kitchener
824 King Street West
N2G 1G1
Construction Health and Safety
Industrial Health and Safety
(519) 744–8101
1–800–265–2373*

London
205 Oxford Street East
N6A 5G6
Construction Health and Safety
Industrial Health and Safety
Mining Health and Safety
(519) 439–3231
1–800–265–4707*

North Bay
Industrial Health and Safety
1500 Fisher Street
Northgate Square
P1B 2H3
(705) 476–2711
1–800–461–1654*

Ottawa
2197 Riverside Drive
K1H 7X3
Construction Health and Safety
Industrial Health and Safety
(613) 523–7530
1–800–267–1916*

Peterborough
139 George Street North
K9J 3G6
Construction Health and Safety
(705) 742–3436
1–800–461–1425*
Industrial Health and Safety
(705) 876–1800
1–800–461–1425*

St. Catharines
205 King Street
L2R 3J5
Construction Health and Safety
Industrial Health and Safety
(416) 682–7261
1–800–263–7260*

Sarnia
Industrial Health and Safety
700 Christina Street North
N7V 3C2
(519) 336–1200
1–800–265–1416*

Sault Ste. Marie
390 Bay Street
P6A 1X2
Construction Health and Safety
Industrial Health and Safety
(705) 949–3331
1–800–461–7268

Sudbury
199 Larch Street
P3E 5P9
Construction Health and Safety
Industrial Health and Safety
(705) 675–4455
1–800–461–4000*
Mining Health and Safety
(705) 675–4464
1–800–461–4000*

Sudbury
260 Cedar Street
P3B 3X2
Mining Health and Safety
(Chief Engineers)
(705) 675–4468
1–800–461–4000*

Thunder Bay
435 James Street South
P7E 6E3
Construction Health and Safety
Industrial Health and Safety
(807) 475–1691
1–800–465–5016(7)*
Mining Health and Safety
(807) 475–1675
1–800–465–5016(7)*

Timmins
273 Third Avenue
P4N 1E2
Construction Health and Safety
Industrial Health and Safety
Mining Health and Safety
(705) 267–6231
Zenith 57740* (Mining)

Toronto East
2500 Lawrence Avenue East
Scarborough
M1P 2R7
Construction Health and Safety
Industrial Health and Safety
(416) 750–3557
1–800–268–6541*

Toronto West
2 Robert Speck Parkway
Mississauga
L4Z 1H8
Construction Health and Safety
Industrial Health and Safety
(416) 273–7800
1–800–268–6541*

Windsor
500 Ouellette Avenue, Suite 305
N9A 1B3
Construction Health and Safety
Industrial Health and Safety
(519) 256–8278
1–800–265–5140(4)*

Health and Safety Support Services Branch Laboratory
101 Resources Road
Weston, Ontario
M9P 3T1
(416) 235–5958

Head Office
400 University Avenue
Toronto, Ontario
M7A 1T7

Construction Health and Safety
(416) 965–7161
1–800–268–8013*
Industrial Health and Safety
(416) 965–4125
1–800–268–8013*
Mining Health and Safety
(416) 965–1328
1–800–268–8013*

Health and Safety Support Services
(416) 965–3211
1–800–268–8013*
Policy and Regulations
(416) 965–6111
(416) 965–8710
1–800–268–8013*

*Toll free line. For callers located within the area code but outside the local calling area of this city. Consult the blue pages in your local telephone directory for additional information. The ministry may also be reached 24 hours a day through the emergency telephone number in Toronto (416) 965–6664.

Appendix 2 – Regulations made under the Occupational Health and Safety Act Revised Statutes of Ontario, 1980, Chapter 321 as at August 31, 1988.

A. Safety Regulations

*Construction Projects:	R.R.O. 1980, Reg. 691 as amended by O. Reg. 635/86 (Re: Crane Operators), O. Reg. 528/88.
Elevated or Suspended Work Places on Building Façades:	O. Reg. 156/84.
*Industrial Establishments:	R.R.O. 1980, Reg. 692 as amended by O. Reg. 525/88.
*Mines and Mining Plants:	R.R.O. 1980, Reg. 694 as amended by O. Reg. 226/83, O. Reg. 569/83, O. Reg. 365/86, O. Reg. 450/86, O. Reg. 569/86, O. Reg. 654/86, O. Reg. 258/87, O. Reg. 526/88.
Critical Injury Defined: (for reference see * above)	O. Reg. 714/82.
Diving Operations:	O. Reg. 634/86.
Fire Fighters Protective Equipment:	O. Reg. 125/83.
Oil and Gas-Offshore:	O. Reg. 633/86.
Roll–Over Protective Structures	O. Reg. 524/88.
Teachers:	O. Reg. 191/84.
University Academics and Teaching Assistants:	O. Reg. 307/84.
Window Cleaning	O. Reg. 527/88.

B. Designated Substances

Acrylonitrile:	O. Reg. 733/84 as amended by O. Reg. 23/87.
Arsenic:	O. Reg. 176/86 as amended by O. Reg. 23/87.

Asbestos:	O. Reg. 570/82 as amended by O. Reg. 655/85, O. Reg. 23/87.
Asbestos on Construction Projects and in Buildings and Repair Operations:	O. Reg. 654/85 as amended by O. Reg. 529/88.
Benzene:	O. Reg. 732/84 as amended by O. Reg. 23/87.
Coke Oven Emissions:	O. Reg. 517/82 as amended by O. Reg. 23/87.
Ethylene Oxide:	O. Reg. 146/87.
Isocyanates:	O. Reg. 455/83 as amended by O. Reg. 23/87.
Lead:	O. Reg. 536/81 as amended by O. Reg. 23/87.
Mercury:	O. Reg. 141/82 as amended by O. Reg. 23/87.
Silica:	O. Reg. 769/83 as amended by O. Reg. 23/87.
Vinyl Chloride:	O. Reg. 516/82 as amended by O. Reg. 23/87.
C. General	
Biological or Chemical Agents, Control of Exposure to:	O. Reg. 654/86 as amended by O. Reg. 707/86, O. Reg. 339/87.
Inventory of Agents or Combinations of Agents for the Purpose of Section 21 of the Act:	R.R.O. 1980, Reg. 693.
D. Hazardous Physical Agents	
X–Ray Safety:	O. Reg. 632/86.

For a complete reference to the Regulations made under the *Occupational Health and Safety Act,* recourse should be made to the Annual Consolidated Index to the Regulations of Ontario.

Notes

Notes

Notes

Ontario
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Labour

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Health and Safety
Division

400 University Ave.
Toronto, Ontario
M7A 1T7